(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 043 807 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
11.10.2000 Bulletin 2000/41

(51) Int. Cl.[7]: **H01R 12/22**

(21) Application number: **00106828.7**

(22) Date of filing: **30.03.2000**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **07.04.1999 US 287896**

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(54) Interposer assembly

(57) An interposer assembly includes an insulating plate with passages extending through the thickness of the plate and metal contacts loosely confined in the passages. The contacts include noses that project outwardly from the plate for engagement with contact pads on overlying and underlying circuit members.

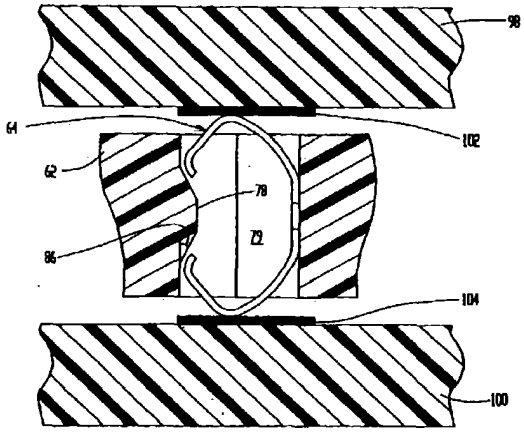

FIG. 8

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Description

Field of the Invention

[0001] The invention relates to interposer assemblies used for forming electrical connections between spaced contact pads on circuit members. It further relates to an insulating body, an assembly comprising an insulating body, an arcuate metal contact and circuit members as well as a method of forming electrical connections.

Description of the Prior Art

[0002] Interposer assemblies are used for forming electrical connections between densely spaced contact pads on adjacent parallel circuit members. The pads on the members are arranged in identical patterns. Commonly, the circuit members are a circuit board and a ceramic plate carrying integrated circuits. The interposer assembly includes an insulating plate and a plurality of through-contacts carried in the plate and arranged in the same pattern as the pads on the circuit members. The contacts project above the top and bottom sides of the plate. The interposer assembly is sandwiched between the two members which are held together with the contacts forming electric connections between aligned pairs of pads.

[0003] Interposer assemblies form electrical connections between contact pads arranged in a very close proximity to each other. The pads may be arranged on a one millimeter center-to-center grid. Each assembly may have as many as 961 contacts and four assemblies. The assemblies are conventionally mounted on a single frame with a total of 3, 844 contacts in the frame. In addition to requiring contacts which can be spaced very close to each other, the contacts must make reliable electrical connections with the pads when the assemblies are sandwiched between the circuit members. Failure of a single contact to make a reliable connection renders the entire frame useless.

[0004] A low mechanical closure force is required in order to prevent undue stress on a ceramic circuit member. A high closure force could distort or possibly break the ceramic member. Further, interposer assemblies must occupy a minimum width between the circuit members, requiring that the individual electrical contacts in the assembly have a limited height yet possess the required spring properties for establishing reliable electrical connections between the pads without undue closing force.

[0005] Conventional interposer assemblies use contacts which occupy a relatively large amount of space in the supporting plate making it difficult to meet closely spaced grid requirements. These assemblies are relatively expensive to manufacture and assemble.

Summary of the Invention

[0006] The invention comprises an improved interposer assembly including metal through contacts loosely confined in closely spaced passages extending through an insulating body. The contacts include arcuate portions which when compressed are elastically bent to form wiped pressure connections with opposed pads and reduce the force necessary to sandwich the interposer assembly between the circuit members. The low closure force reduces the risk of damage to an overlying ceramic substrate and allows a large number of contacts in the assembly. The wiped electrical connections between the contacts and the circuit pads form reliable electrical connections between the adjacent pairs of pads and permit installation of the interposer assemblies in user's facilities. The assemblies need not be installed in clean rooms.

[0007] The disclosed interposer assembly uses a body and contacts which are easily and inexpensively manufactured and assembled. The body is a one-piece design and includes through passages with contact retention projections extending into the passages. The arcuate contacts are readily inserted into the passages to snap or latch over the projections, which then hold the contacts loosely in place in the passages prior to sandwiching of the assemblies between circuit members. The contacts are compact, permitting use of the assembly to form electrical connections between very closely spaced contact pads.

[0008] The invention further comprises an insulating body, an assembly comprising an insulating body, an arcuate metal contact and circuit members as well as a method of forming electrical connections between spaced contact pads on circuit members.

[0009] In the following, two embodiments are presented with insulating bodies in form of flat plates. The second embodiment is a preferred embodiment of the invention. The first embodiment has only one sloped cam surface and illustrates the invention with respect to the other features.

[0010] In the first embodiment each contact retention projection includes a single sloped cam surface facing one side of the plate. The through contacts are inserted into the plate from the side adjacent the cam surfaces. During insertion, the lead ends of the contacts engage the cam surfaces and are guided over the retention projections. When fully inserted, the contacts are held in the passages by the retention projections which extend between the free ends of the contacts. The contacts are loosely held in the passages with opposed contact noses spaced apart a distance greater than the thickness of the plate. When compressed, the contacts establish reliable wiped contacts with opposed pads.

[0011] In the second embodiment sloped cam surfaces are provided on both sides of the projection. The arcuate through contacts may be inserted from either side of the plate. During insertion, the lead ends of the contacts engage cam surfaces and are guided past the projections which then hold the contacts in place. The contact noses are spaced apart a distance greater than the width of the plate to form wiped pressure contacts with opposing pads.

[0012] When the contact is positioned in a through passage in the second embodiment, rounded surfaces at the free ends of the contact are located adjacent the cam surfaces on either sides of the projection. The cam surfaces hold the contact loosely within the passage for floating engagement with opposed contact pads and formation of reliable wiped pressure connections with the pads. The free ends of the contacts are held within the thickness of the plate to limit contact float. The sloped cam surfaces extend to the adjacent side of the contact passages and assure that during insertion of the contacts into the passages the lead ends of the contacts are guided smoothly over the projections and do not hang up in the corners or junctions between the projections and the adjacent walls. On rare occasions, contacts inserted into the passages in the first embodiment interposer assembly catch in the corners and have been permanently shortened, destroying their ability to form connections between pads.

[0013] Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings illustrating the invention, of which there are six sheets of drawings and the two embodiments are disclosed.

Description of the Drawings

[0014]

Figure 1 is a top view of the first embodiment;

Figure 2 is a sectional view taken along line 2--2 of Figure 1;

Figure 3 is a sectional view illustrating the position of the assembly of Figure 1 between two circuit members;

Figure 4 is a view like Figure 3 showing the assembly sandwiched between the circuit members;

Figure 5 is a perspective view of the contact shown in the assembly of Figure 1;

Figure 6 is a sectional view illustrating insertion of the contact member of Figure 5 into a passage extending through the plate;

Figure 7 is a sectional view of the second embodiment like Figure 2;

Figure 8 is a sectional view illustrating the position of the assembly of Figure 7 between two circuit members;

Figure 9 is a view like Figure 8 showing the assembly partially sandwiched between the circuit members;

Figure 10 is a view like Figure 8 showing the assembly sandwiched between the circuit members;

Figure 11 is a perspective view of the contact shown in the assembly of Figure 7; and

Figure 12 is a sectional view illustrating insertion of the contact member of Figure 11 into a passage extending through the plate.

Description of the Embodiments

[0015] First embodiment interposer assembly 10 includes a flat plate 12 formed of insulating material with a plurality of metal through contacts 14 positioned in contact passages 16 extending through the thickness of the plate between opposed plate top and bottom sides 18 and 20. As shown in Figure 1, passages 16 are each provided with a reduced width side 22 and a uniform width portion 24 away from side 22. Flat side wall 26 extends across the uniform width portion 24 opposite the reduced width side 22.

[0016] Contact retention projections 28 are provided in the reduced width sides 22 of passages 16. Projections 28 extend a distance into the passages and narrow the passages at portions 29 between the projections and side walls 26. Narrow portion 29 extends from projection free end 31 to wall 26. The projections include contact retention surfaces 30 and 32 facing plate sides 18 and 20, respectively. The surfaces 30 and 32 are spaced in from the top and bottom sides of the plate. A sloped cam surface 34 extends from each retention surface 30 to the free end 31 of the projection 28 and faces top side 18. Surface 34 facilitates insertion of a contact 14 into passage 16.

[0017] Each metal contact 14 is preferably formed from uniform thickness strip stock, which may be suitably plated beryllium copper. The contact is generally ID-shaped and includes a arcuate, convex spring 36 with a pair of opposed contact noses or pad contacts 38 at the ends of the spring. The center of spring 36 extends through narrow passage portion 29. The noses are spaced apart a distance greater than the thickness of the plate 12. Short retention legs 40 extend inwardly from the noses to free ends 42. The legs 40 extend away from spring 36 so that the noses 38 are located between the free ends 42 and the spring. As illustrated in Figure 5, spring 36 has a maximum width at the center, midway between noses 38 and includes two tapered width spring arms 44 each extending from the center of the spring to a nose 38, in order to reduce stress concentration when the spring is stressed.

[0018] Contacts 14 are inserted into passages 16 as shown in Figure 6. One nose of the contact is extended into the end of the passage opening at plate top side 18 and is positioned in narrowed portion 29 between the projection 28 and wall 26. As contact 14 is inserted into the passage leg 40 is guided cam surface 34 to the end of the projection. Spring 36 engages wall 26. The contact is then inserted further into the passage with the result that the lower spring arm 44 is elastically stressed, leg 40 is moved past projection 28 and through narrowed portion 29 and snaps back under retention surface 32 of projection 28. With the contact inserted in passage 16 end 42 of the upper retention leg 40 is above the upper retention surface 30, end 42 of the lower retention leg 40 is located below the lower retention surface 32 and the center 41 of the arcuate spring is adjacent the flat wall 26. Spring 36 is bowed toward wall 26. The contact is loosely held in the passage between side 22 and side wall 26 and with the projection between the ends 42 of the contact spring 36 at passage portion 29. The distance between the free ends 42 of legs 40 is greater than the height of projection 28, permitting limited free or float movement of the contact in passage 16. Figure 2 illustrates the position of the contact in the passage when plate 12 is horizontal and the loose contact 14 is supported in the cavity against gravity with the end of the upper leg 40 resting on upper retention surface 30 of projection 28.

[0019] As illustrated in Figure 1, the passages 16 are arranged close to each other in a dense array on plate 12 in order to permit forming electrical connections between similar arrays of contact pads on circuit elements located above and below the assembly. Conventionally, assembly 10 is used for forming electrical connections between contact pads on a ceramic integrated circuit and contact pads of a circuit board. The assembly may be used for forming electrical connections between contact pads on two circuit boards or between contact pads on other types of circuit members.

[0020] Figure 3 illustrates the interposer assembly 10 positioned between upper and lower circuit members 46 and 48 with contact pads 50 and 52 on the members located above and below each contact in the assembly. The contacts lightly engage the pads and are not stressed.

[0021] Figure 4 illustrates the assembly 10 when fully sandwiched between members 46 and 48 with the members held tightly against the plate 12. When the members are brought into contact with the assembly 10 the two contact pads 50 and 52 are moved together to reduce the height of contacts 14 and elastically bend the two tapered spring arms 44 of arcuate spring 36. The center of the spring engages the side wall 26 as shown in Figure 4. Bending of the arcuate spring and foreshortening of the contact moves or wipes the contact noses 38 a distance along the contact pads toward side 22 to make clean, low resistance pressure electrical connections between the contact noses 38 and the pads 50 and 52. The connections assure that the contact 14 provides a reliable, low resistance electrical path between the pads.

[0022] As illustrated in Figure 4, foreshortening of contact 14 moves the free ends 42 of retention legs 40 together and brings the ends in close proximity to the retention surfaces 30 and 32 of projection 28. The retention legs do not engage the projection. Contact pressure is maintained by elastic bending of the spring 36 without bottoming of the ends of the contact on the projection or the walls of passage 16 which could undesirably increase the closing force.

[0023] Figures 7-12 illustrate a second embodiment interposer assembly 60. Interposer assembly 60 includes a flat plate 62 formed of insulating material with a plurality of metal through contacts 64 positioned in contact passages 66 extending through the thickness of the plate between opposed plate top and bottom sides 68 and 70. As shown in Figure 7, passages 66 are each provided with a reduced width side 72, like passage side 22 in the plate 12 passages, and a uniform width portion 74 away from side 72. Flat side wall 76 extends across the uniform width portions 74 opposite the reduced width side 72.

[0024] Contact retention projections 78 are provided in the reduced width sides 72 of passages 66. Projections 78 extend a distance into the passages and narrow the passages at portions 79 between the projection and side walls 76. Each projection 78 extends from side 72 to an inner free end 80 spaced from side wall 76 and facing the narrowed passage portion 79. The projections 78 are centered in the passages 66 between the top and bottom sides of the plate.

[0025] The projections 78 include sloped upper and lower cam surfaces 82 and 84 facing plate top and bottom 68 and 70, respectively. The cam surfaces 82 and 84 are spaced in from the top and bottom sides of the plate. Each upper cam surface 82 faces top side 68 and extends from wall side 72 towards bottom side 70 to the inner end 80. Each lower cam surface 84 faces bottom side 70 and extends from wall side 72 towards top side 68 to the inner end 80. As shown in Figure 8, the upper and lower cam surfaces 82 and 84 are generally planar and slope at an angle 86 with respect to the axis of passage 66. Angle 86 is preferably about 25 degrees. From the above description should be clear, that the cam surfaces 82 and 84 slope from side 72 towards the inner free end 80 of the projection 78 such that the thickness of the projection 78 decreases continuously in this direction. Since the inner free end 80 projects into a free space of passage 66, contact 64 can be inserted into the passage 66 by snapping or latching over the inner free end 80. Cam surfaces 82 and 84 facilitate insertion of contact 64 into passage 66 from either the top or bottom side of plate 62.

[0026] The contact 64 is arcuate and includes a flat central spine 88 and upper and lower tapered spring arms 90 extending from the ends of spine 88. Curved contact noses or pad contacts 92 are provided on the outer ends of arms 90. Retention legs 94 extend inwardly from the noses to rounded free ends 96. The contact noses 92 are spaced apart a distance greater than the thickness of the plate 62. The legs 94 extend away from spine 88 so that the noses 92 are located between the ends 96 and the spine.

[0027] Each metal contact 64 is preferably formed from the same stock as metal contacts 14. The through contacts 14 used in first embodiment assembly 10 and through contacts 64 used in the second embodiment assembly 60 are

each bent from identical flat preforms punched from thin strip metal stock, as previously described.

[0028] Contacts 64 are inserted into passages 66 as shown in Figure 12. One nose 92 of the contact is extended into the end of the passage opening at plate top side 68 and is positioned between the projection 78 and side wall 76. As the contact is inserted into the passage surface 95 on the lower leg 94 serves as a cam follower and is guided by upper cam surface 82 to the end of the projection. Spine 88 slides along wall 76. The upper cam surface 82 extends smoothly from side 72 so that contact 64 does not bind or catch between projection 78 and side 72 when leg 94 engages the projection 78.

[0029] The contact is then moved further into the passage and the lower spring arm is elastically stressed as lower leg 94 moves past projection 78 and then snaps back under lower cam surface 84. With the contact inserted in passage 66 the spring arms 90 are bowed toward wall 76 with the upper end 96 located above upper cam surface 82 and the lower end 96 located below the lower cam surface 84. The spine 88 of the contact center portion is adjacent the flat end wall 76. In this position, the contact 64 is loosely confined within passage 66 with both free ends 96 located within the thickness of the plate 62. Confinement of the free ends within the thickness of the plate assures that, on collapse, the height of the contact is reduced as described without capture of a free end on one side of the plate. Such capture would prevent the contact from forming a reliable electrical connection between opposed pads. The convex side of each free end 96 faces the adjacent cam surface 82 or 84.

[0030] If desired, contacts 64 could be inserted into the plate from the bottom side 70 in the same manner as previously described.

[0031] Contacts 64 are loosely held in passage 66. Projections 78 extend between contact ends 96. The distance between ends 96 is greater than the height of projections 78 between the ends 96, permitting limited free movement or float of the contacts in passages 66. Figure 7 illustrates the position of the contact in the passage when plate 62 is horizontal and the loose contact 64 is supported in the cavity against gravity. The upper curved end 96 of the upper leg 94 rests on the upper cam surface 82 of projection 78 and the lower curved end 96 of the lower leg 94 remains in the passage. Spine 88 engages wall side 76 and maintains the contact in substantially vertical alignment in the passage.

[0032] Spine 88 also resists rocking or rotation of the contact in a clockwise or counterclockwise direction as viewed in Figure 7. Rocking of the contact is also limited by the proximity of the contact ends 96 to side 72 and cam surfaces 82 and 84. The loose confinement of the contact in the passage assures that the contact in position to be collapsed to form a reliable connection between opposed pads.

[0033] Passages 66 are arranged close to each other in a dense array in plate 62 in the same manner as passages 16 are arranged in plate 12.

[0034] Figure 8 illustrates the interposer assembly 60 positioned between upper and lower circuit members 98 and 100 with contact pads 102 and 104 on the members located above and below contacts in the assembly. The contacts lightly engage the pads and are not stressed.

[0035] Figure 9 illustrates the assembly 60 when partially sandwiched between members 98 and 100. When the members are brought toward assembly 60 the two contact pads 102 and 104 are moved together to reduce the height of contacts 64 and elastically bend the two tapered spring arms 90. The curved ends 96 of retention legs 94 move towards each other and towards side wall 76. The upper and lower curved ends 96 contact upper and lower cam surfaces 82 and 84 respectively as shown in Figure 10. After contact, each curved end 96 slides along the cam surface towards projection inner end 80. The curved ends 96 roll slightly on the cam surfaces and maintain tangential engagement with the cam surfaces as the legs slide inwardly toward the free end of the projection. Spine 88 remains flush on side wall 76. Contact noses 92 are wiped along the contact pads toward side 72.

[0036] Figure 10 illustrates the assembly 60 when fully sandwiched between members 98 and 100 with the members held tightly against the assembly plate 62. When the members are brought into contact with the assembly 60 contact pads 102 and 104 reduce the height of contacts 64 to a minimum and further elastically bend spring arms 90. The upper and lower curved ends 96 remain engaged with the cam surfaces near projection inner end 80. The contact spine 88 remains on side wall 76. Contact noses 92 have moved further along the contact pads to their position nearest side wall 72. The movement or wiping of contact noses 92 along the contact pads make clean, low resistance pressure electrical connections between the contact noses 92 and the pads 102 and 104.

[0037] As illustrated in Figure 10, foreshortening of contact 64 moves the curved end portions 96 of retention legs 94 together and brings the ends into engagement with cam surfaces 82 and 84 of projection 78. Contact pressure is maintained by elastic bending of contact 64 despite engagement of the end portions of the contact with the projection. The slope of the cam surfaces and the curved contact end portions allow the contact to deform without binding on the projection, which could undesirably increase the closing force or permanently deform the contact.

[0038] In both embodiments, the projections are located in the center of the contact passages and are spaced inwardly from the opposing top and bottom sides of the plate. As illustrated, both passages have a uniform transverse cross section, with the exception of the projections. Also, in both embodiments the central portion of the metal contact overlies the free end of the projection and the contact free ends are located between the free end of the projection and the side of the passage supporting the projection. Each contact 14 and 64 is symmetrical to either side of the central portion.

[0039] While we have illustrated and described preferred embodiments of our invention, it is understood that this is capable of modification, and we therefore do not wish to be limited to the precise details set forth, but desire to avail ourselves of such changes and alterations as fall within the purview of the following claims.

Claims

1. An interposer assembly (60) comprising:

   A) an insulating body (12; 62) having a first and an opposing second side (18, 20; 68, 70) and a thickness, a passage (16; 66) through the thickness of the body, a projection (28; 78) extending into the passage from a first side of the passage (22; 72) to a free end (31; 80), said free end spaced from a second side of the passage (26; 76) by a narrowed portion of the passage (29; 79), the projection including a first (34; 82) and a second (84) cam surface both extending from the free end of the projection toward the first side of the passage, the first cam surface facing the first body side and sloping from the free end towards the first body side, the second cam surface facing the second body side and sloping from the free end towards the second body side; and

   B) an arcuate metal contact (14; 64) in the passage, the contact including a center portion (41; 88) located in the narrowed portion of the passage, a pair of pad contacts (38; 92) spaced apart a distance greater than the thickness of the body when the contact is unstressed, a pair of spring arms (44; 90) extending from the center portion to the pad contacts, and retention legs (40; 94) extending from the pad contacts to contact ends (42; 96), said projection located between said contact ends.

2. The interposer assembly as in claim 1 wherein the retention legs extend inwardly and the contact ends are spaced apart a distance greater than the height of the projection.

3. The interposer assembly as in claim 1 or 2 wherein said contact floats freely within the passage.

4. The interposer assembly as in one of the preceding claims wherein the center portion of the contact is flat and extends along the second side of the passage.

5. The interposer assembly as in one of the preceding claims wherein the center portion is overlying the free end of the projection.

6. The interposer assembly as in one of the preceding claims wherein said arms are tapered.

7. The interposer assembly as in one of the preceding claims wherein the passage adjacent the first side is narrower than the passage adjacent the second side.

8. The interposer assembly as in one of the preceding claims wherein said passage has a uniform transverse cross section with the exception of the projection.

9. The interposer assembly as in one of the preceding claims wherein each cam surface extends from the free end of the projection to the first side of the passage.

10. The interposer assembly as in claim 9 wherein said cam surfaces are generally flat.

11. The interposer assembly as in claim 9 or 10 wherein each cam surface extends at an angle of about 28 degrees to the axis of the passage.

12. The interposer assembly as in one of the preceding claims wherein said contact ends are rounded and face the cam surfaces.

13. The interposer assembly as in one of the preceding claims wherein said pad contacts are located between the center portion of the metal contact and the contact ends.

14. The interposer assembly as in one of the preceding claims wherein said contact is formed from uniform thickness strip metal stock, and said pad contacts are on one side of said stock.

15. The interposer assembly as in one of the preceding claims wherein said pad contacts comprise folded noses.

16. The interposer assembly as in one of the preceding claims wherein said contact is symmetrical to either side of the center portion.

17. The interposer assembly as in one of the preceding claims wherein said contact is formed from a portion of uniform thickness strip metal stock having two sides, said center portion includes a surface facing said second passage side, such surface and said pad contacts lying on one of said two sides.

18. The interposer assembly as in claim 17 wherein the contact ends are rounded, face the cam surfaces and lie on said one of said two sides.

19. The interposer assembly as in one of the preceding claims wherein said passage has a uniform cross section away from the projection.

20. The interposer assembly as in one of the preceding claims wherein said projection is spaced inwardly from the top and bottom of the body.

21. The interposer assembly as in one of the preceding claims wherein the metal contact is formed from strip metal stock and the width of the spring arms decreases from the center portion to the pad contacts.

22. The interposer assembly as in one of the preceding claims wherein the body is unitary.

23. An insulating body (12; 62) having a first and an opposing second side (18, 20; 68, 70) and a thickness, a passage (16; 66) through the thickness of the body, a projection (28; 78) extending into the passage from a first side of the passage (22; 72) to a free end (31; 80), said free end spaced from a second side of the passage (26; 76) by a narrowed portion of the passage (29; 79), the projection including a first (34; 82) and a second (84) cam surface both extending and sloping from the free end of the projection toward the first side of the passage, the first cam surface facing the first body side, and the second cam surface facing the second body side.

24. An insulating body as in claim 23 with one or several features of claims 7 to 11, 19, 20 and 22.

25. An assembly comprising:

A) an insulating body (12; 62) having a first and an opposing second side (18, 20; 68, 70) and a thickness, a passage (16; 66) through the thickness of the body, a projection (28; 78) extending into the passage from a first side of the passage (22; 72) to a free end (31; 80), said free end spaced from a second side of the passage (26; 76) by a narrowed portion of the passage (29; 79), the projection including a first (34; 82) and a second (84) cam surface both extending from the free end of the projection toward the first side of the passage, the first cam surface facing the first body side and sloping from the free end towards the first body side, the second cam surface facing the second body side and sloping from the free end towards the second body side;

B) an arcuate metal contact (14; 64) in the passage, the contact including a center portion (41; 88) located in the narrowed portion of the passage, a pair of pad contacts (38; 92) spaced apart a distance greater than the thickness of the body when the contact is unstressed, a pair of spring arms (44; 90) extending from the center portion to the pad contacts, and retention legs (40; 94) extending from the pad contacts to contact ends (42; 96), said projection located between said contact ends; and

C) upper and lower circuit members (98, 100), said insulating body being fully sandwiched between the members, the members comprising contact pads (102, 104) engaging the pad contacts of said arcuate metal contact and compressing said arcuate metal contact such that said pad contacts are spaced apart a distance within the thickness of the body and said contact ends of the retention legs engage said cam surfaces of the projection.

26. An assembly as in claim 25 with one or several features of claims 2 to 22.

27. Method of forming electrical connections between opposed circuit member contact pads (102, 104),

using an interposer assembly (60) comprising:

A) an insulating body (12; 62) having a first and an opposing second side (18, 20; 68, 70) and a thickness, a passage (16; 66) through the thickness of the body, a projection (28; 78) extending into the passage from a first side of the passage (22; 72) to a free end (31; 80), said free end spaced from a second side of the passage (26; 76) by a narrowed portion of the passage (29; 79), the projection including a first (34; 82) and a second (84) cam surface bath extending from the free end of the projection toward the first side of the passage, the first cam surface facing the first body side and sloping from the free end towards the first body side, the second cam surface facing the second body side and sloping from the free end towards the second body side; and

B) an arcuate metal contact (14; 64) in the passage, the contact including a center portion (41; 88) located in the narrowed portion of the passage, a pair of pad contacts (38; 92) spaced apart a distance greater than the thickness of the body when the contact is unstressed, a pair of spring arms (44; 90) extending from the center portion to the pad contacts, and retention legs (40; 94) extending from the pad contacts to contact ends (42; 96), said projection located between said contact ends;

and sandwiching said interposer assembly between said circuit member contact pads, the sandwiching process starting from a stage when the arcuate metal contact is unstressed and ending at a stage when said arcuate metal contact is stressed such that the pad contacts of said arcuate metal contact are spaced apart a distance within the thickness of the body, with said pad contacts being engaged of and being wiped along the circuit member contact pads (102, 104) and with said retention legs of the arcuate metal contact engaging and moving along the cam surfaces of said projection.

28. A method as in claim 27 with one or several features of claims 1 to 26.

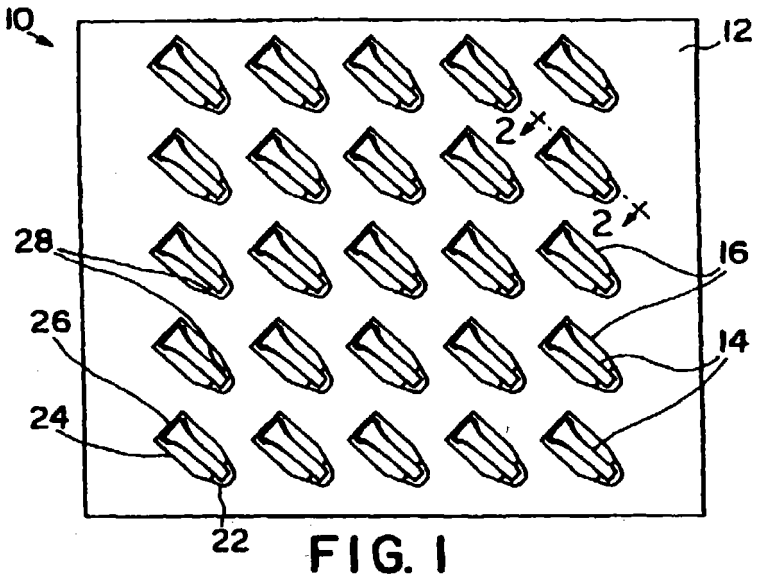
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FIG. 1

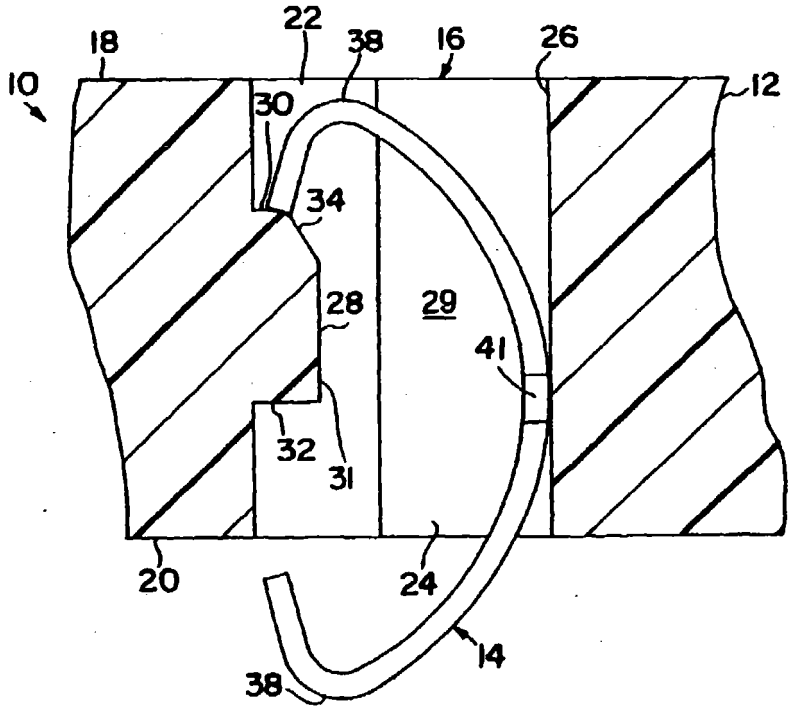
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FIG. 2

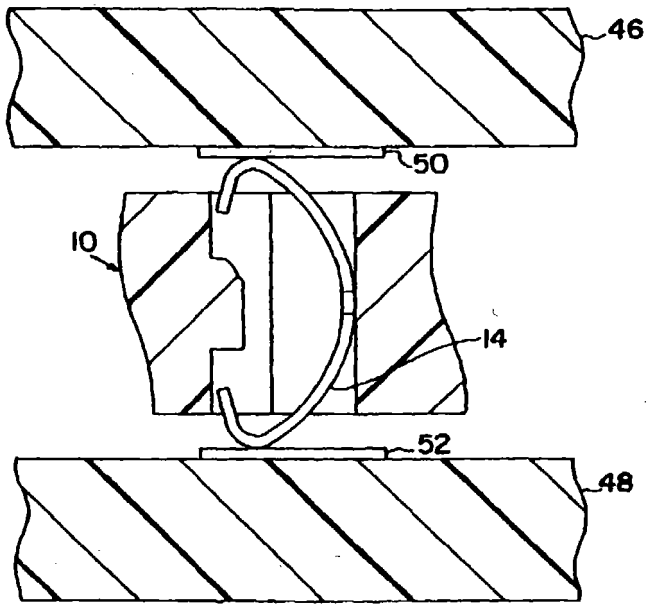

FIG. 3

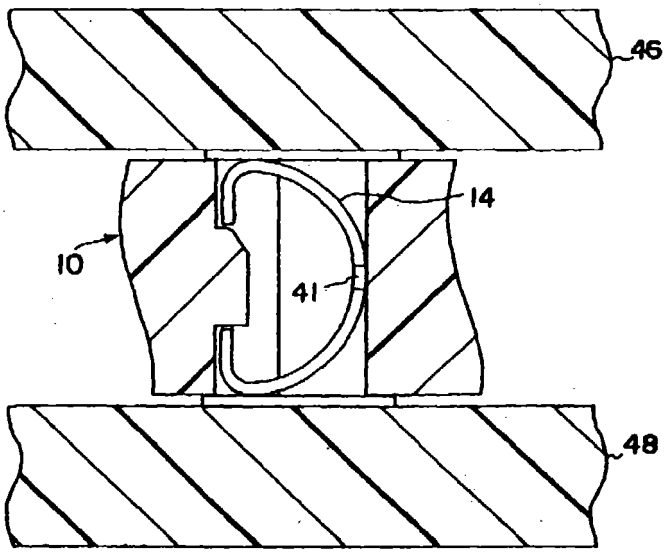

FIG. 4

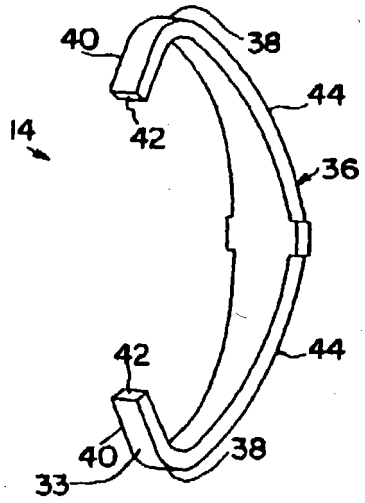
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FIG. 5

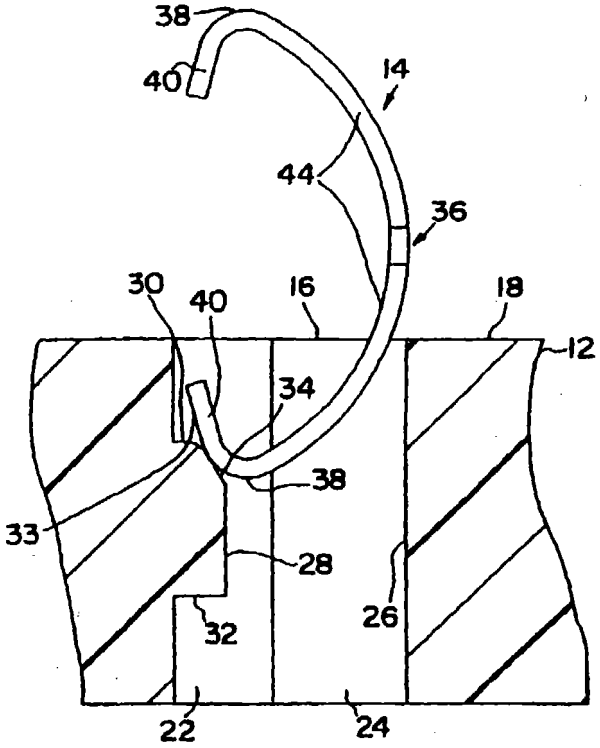
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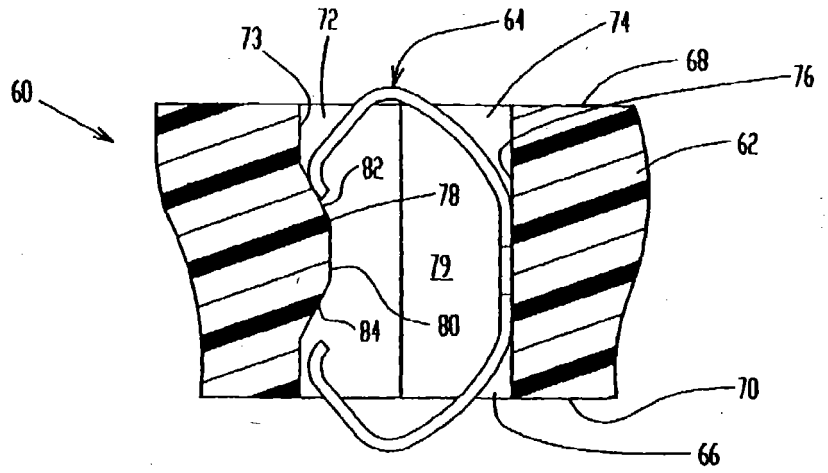
FIG. 6


60
73
72
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74
68
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82
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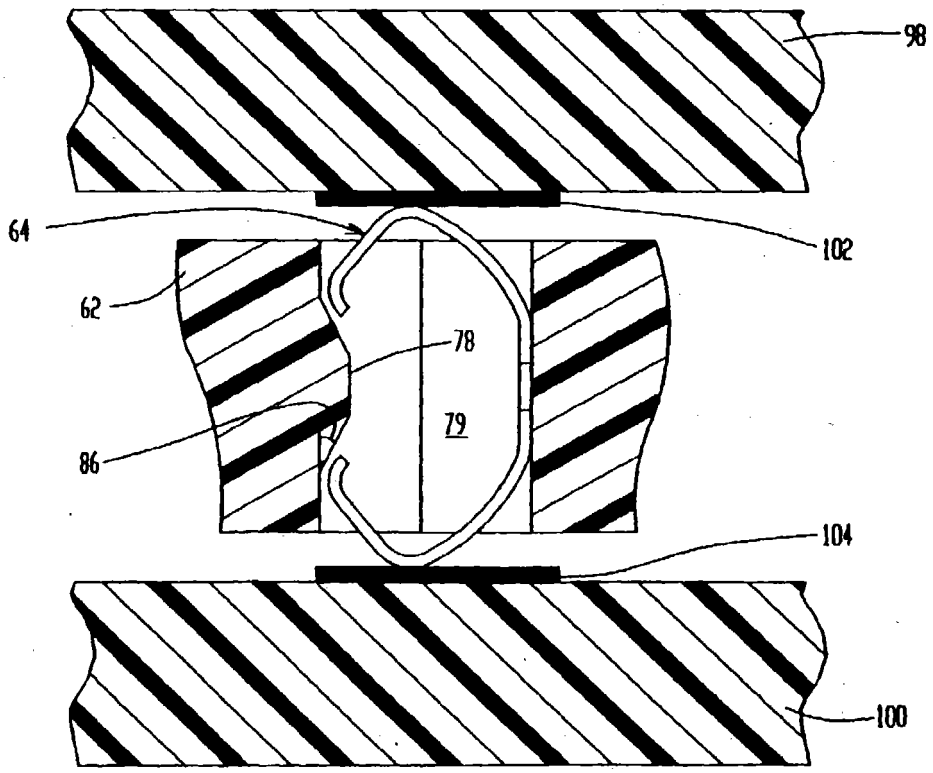
84
80
70
66

FIG. 7


98
64
102
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86
104
100

FIG. 8

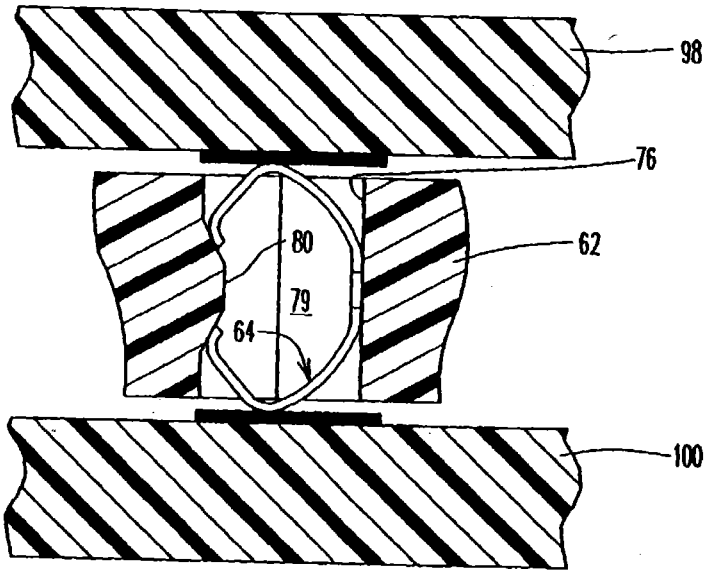


FIG. 9

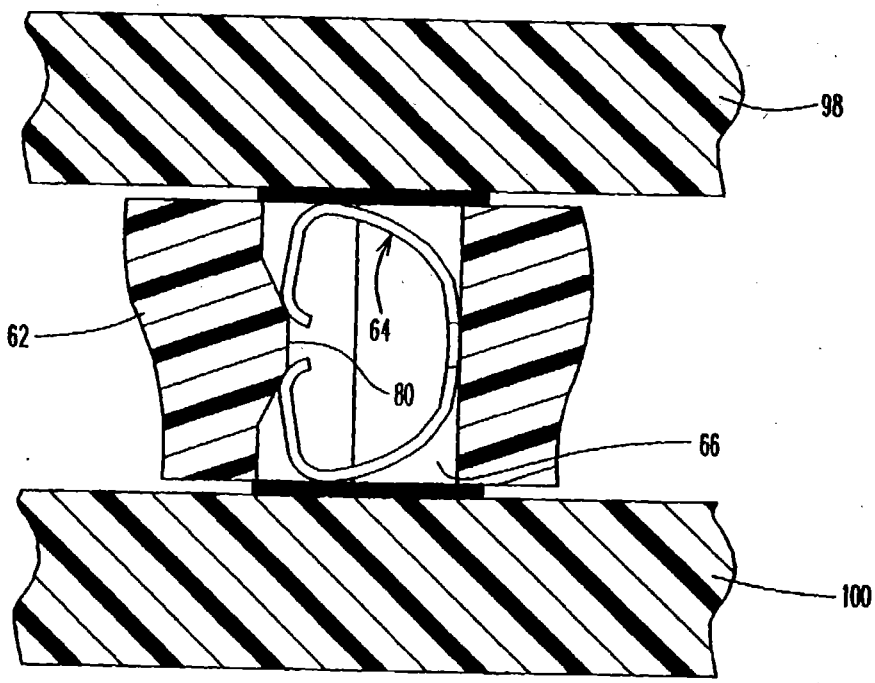
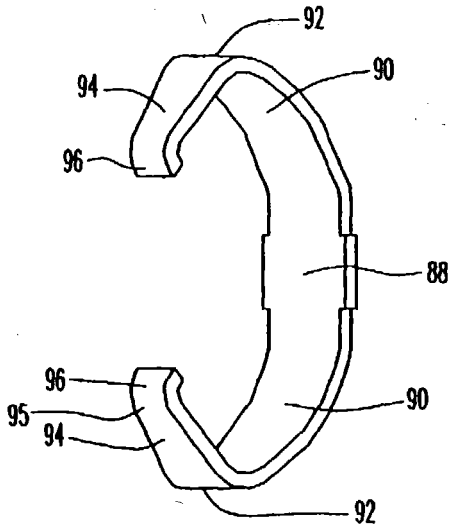


FIG. 10


92
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92

FIG. 11

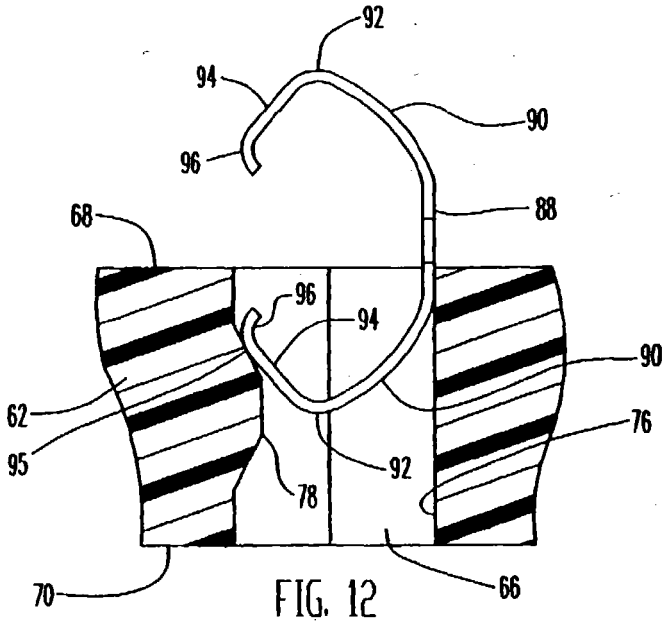
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FIG. 12